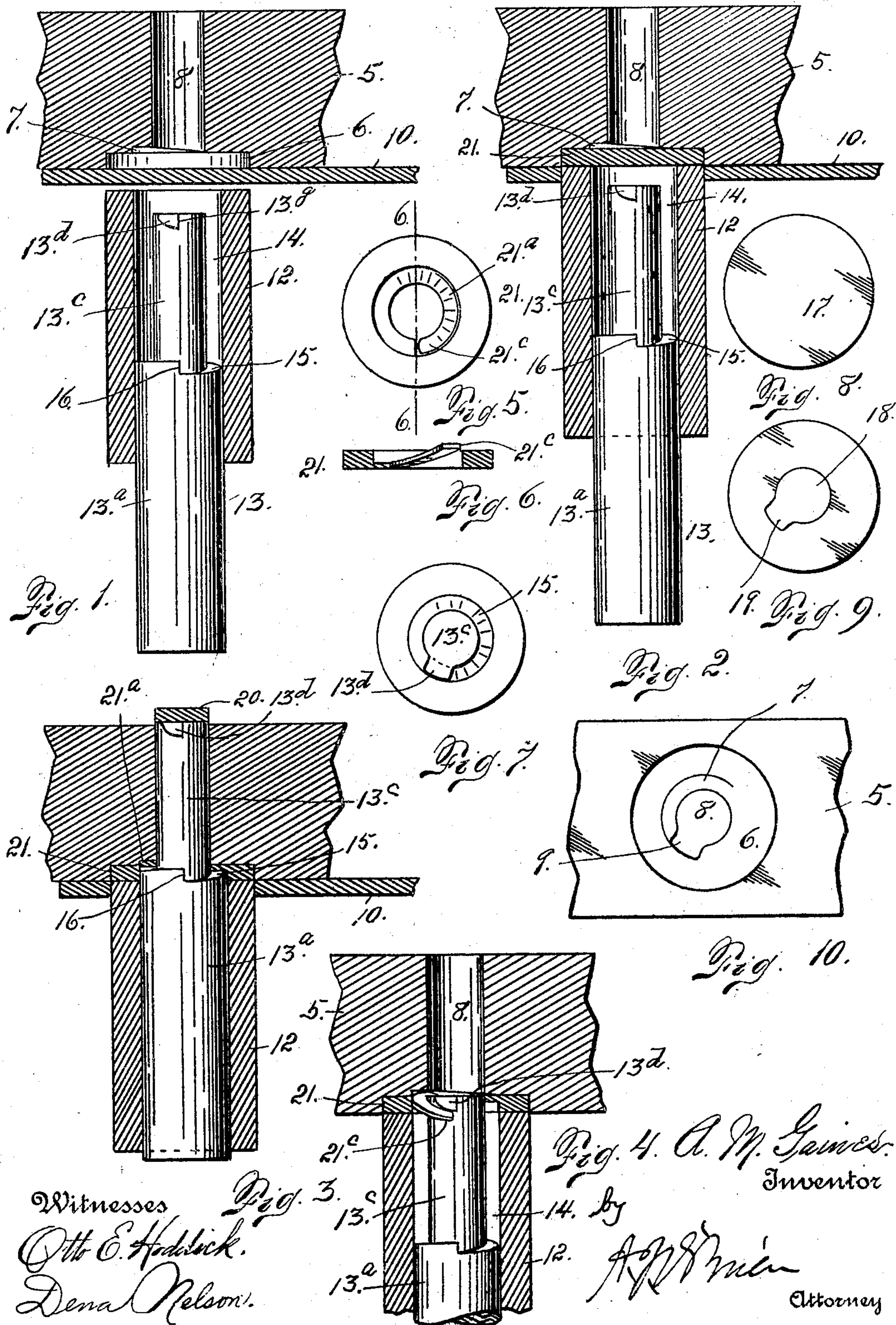


No. 795,794.

PATENTED JULY 25, 1905.

A. M. GAINES.  
MEANS FOR FORMING NUT LOCKING WASHERS.

APPLICATION FILED NOV. 26, 1904.



Witnesses  
Otto E. Haddock.  
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Fig. 4. A. M. Gaines.  
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# UNITED STATES PATENT OFFICE.

ALFRED M. GAINES, OF DENVER, COLORADO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO CAPITOL LOCK-NUT AND WASHER COMPANY, A CORPORATION OF NEW JERSEY.

## MEANS FOR FORMING NUT-LOCKING WASHERS.

No. 795,794.

Specification of Letters Patent.

Patented July 25, 1905.

Application filed November 26, 1904. Serial No. 234,336.

*To all whom it may concern:*

Be it known that I, ALFRED M. GAINES, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Means for Forming Nut-Locking Washers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in means for forming nut-locking washers—that is to say, washers having recesses immediately adjacent the bolt-hole, the bottoms of the recesses being cut through to form tongues projecting beyond the nut-engaging faces of the washers to engage ratchet-nuts with which the washers are intended to be used.

My improved mechanism consists of a die and two coöperating punches one working within the other, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a section taken through the parts of my improved device, except the inner punch, which is shown in elevation. Fig. 2 is a similar view showing the parts in a different position or after the first washer-forming step has been performed. Fig. 3 is a similar view showing the position of the two punches at their forward limit of movement. Fig. 4 is a view illustrating the inner punch partly withdrawn in order to raise the tongue of the washer beyond its nut-engaging face. Figs. 5 and 6 are plan and sectional views of the washer in its completed form. Fig. 7 is a detail view of the two punches connected in operative relation. Fig. 8 is a detail view of the washer-blank after it has been punched out by the outer punch. Fig. 9 is a view of the washer after it has been acted on by the forward member of the inner punch. Fig. 10 is a face view of the die.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the die, which is provided with a main washer-recess 6, an

inclined bottom recess 7, and an opening 8, having a groove 9 at one side thereof.

The plate 10, from which the washers are to be formed, is placed over the face of the die, and the punches 12 and 13 are forced against the plate in accurate alinement with the recess 6. The punch 12 is a hollow cylindrical device having its operating extremity lying in a single plane. The opening 14 of the punch 12 is of such size as to just fit the cylindrical member 13<sup>a</sup> of the inner punch 13. This cylindrical member is provided with an inclined face 15, having an offset 16 at one extremity.

The forward extremity of the extension member 13<sup>c</sup> is provided with a laterally-extending lug 13<sup>d</sup>, having a vertical face 13<sup>e</sup> in line with the offset 16 of the member 13<sup>a</sup>.

Now during the operation of the punch for washer-making purposes the part 12 is made to act first upon the plate 10, whereby the blank 17 (see Fig. 8) is thrust out of the plate and into the recess 6 of the die. (See Fig. 2.) The inner punch 13 is next thrust forward against the blank 17, forming an opening 18 and a groove 19 at one side, communicating with the main opening, the said groove being formed by the lug 13<sup>d</sup>. As the inner punch 13 continues its forward movement the inclined opposite extremity of the member 13<sup>a</sup> is forced against the blank or driven to the position illustrated in Fig. 3 of the drawings, whereby the part 20, punched from the blank by the member 13<sup>c</sup>, is expelled and the completed washer 21 formed. The inclined face 15 of the member 13<sup>a</sup> forms a circular recess in the blank and at the same time cuts a portion 21<sup>a</sup> of the bottom of this recess from the body of the washer on one side and forces it into the recess 7 of counterpart shape, formed in the bottom of the washer-recess of the die. At the same time the said inclined face 15 of the member 13<sup>a</sup> flattens out or acts on the material formerly occupied by the recess of the washer to form a continuation 21<sup>c</sup> of the part 21<sup>a</sup>, which is also forced into the inclined recess 7 of the die. The action of the punches has thus completed the washer before the tongue for engaging the ratchet-face of the nut is in the bottom of the recess 7. Now while the punch 12 is held in the position shown in Fig. 3 the inner punch is moved rearwardly, whereby the lug 13<sup>d</sup> is made to

act on the tongue 21<sup>a</sup> 21<sup>c</sup>, whereby the extremity 21<sup>c</sup> is made to protrude slightly above the nut-engaging face of the washer or the face opposite the bottom of the circular recess of the washer.

Having thus described my invention, what I claim is—

Means for making washers provided with a tongue for engaging the teeth of a ratchet-nut, comprising a die having a main washer-recess, and an inclined recess in the bottom of the washer-recess, a hollow outer punch, and an inner punch working in the hollow of the outer punch and having two members of un-

equal size, the larger and rearward member having an inclined operating-face, and the smaller member extending forwardly from the operating-face of the larger member and having a laterally-projecting lug in line with the highest portion of the inclined face of the larger member, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALFRED M. GAINES.

Witnesses:

DENA NELSON,  
O. E. HODDICK.